

WHAT IS CLAIMED IS:

1. An automated microarray printer machine having the capability of automatically transporting a plurality of microarray workpieces before or after printing operations by a printer device of said microarray printer machine, said automated microarray printer machine comprising:

5 a storage unit for storing said plurality of microarray workpieces;
a workstation; and

a retrieval mechanism for retrieving one of said plurality of microarray workpieces from said storage unit and presenting said microarray workpiece to said workstation.

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2. The automated microarray printer machine of Claim 1, wherein said storage unit has a storage frame, a storage rack and a first means for translating said storage rack in a first plane, said storage rack adapted to store said plurality of microarray workpieces, said storage rack mounted slidably to said storage frame in said first plane.

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3. The automated microarray printer machine of Claim 1, wherein said workstation is an alignment mechanism.

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4. The automated microarray printer machine of Claim 1, wherein said retrieval mechanism has a loader frame, a loader arm and a second means for translating said loader arm in a second plane, said loader arm mounted slidably to said loader frame in the second plane, said loader arm capable of accessing one of said plurality of microarray workpieces from said storage unit, said loader arm having a vacuum chuck for retaining said one of said plurality of microarray workpieces on said loader arm.

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5. The automated microarray printer machine of Claim 1, wherein said plurality of microarray workpieces are a plurality of microscope slides.

6. A retrieval unit for a microarray processing device to transport a workpiece before or after processing operations by said microarray processing device, said retrieval unit comprising:
- 5 a storage unit having a storage frame, a storage rack and a first motor, said storage rack adapted to store said workpiece, said storage rack mounted slidably to said storage frame in a first plane, said first motor adapted to slide said storage rack in said first plane; and
- 10 a lifter unit having a loader frame, a loader arm and a second motor, said loader arm mounted slidably to said loader frame in a second plane, said second motor adapted to slide said loader arm in the second plane, said loader arm capable of accessing said workpiece from said storage rack, said loader arm having a vacuum chuck for retaining said workpiece on said loader arm.
- 15 7. The retrieval unit of Claim 6, wherein said microarray processing device is a microarray printer.
8. The retrieval unit of Claim 6, wherein said workpiece is a microscope slide.
- 20 9. The retrieval unit of Claim 6, wherein said storage rack has a plurality of slots adapted to receive a plurality of workpiece containers, each workpiece container capable of retaining a plurality of workpieces.
10. The retrieval unit of Claim 9, wherein each of said plurality of slots has a
25 sensor to determine whether one of said plurality of workpiece containers is contained within said slot.
11. The retrieval unit of Claim 6, wherein said loader arm has a third motor adapted to slide said vacuum chuck in a third plane.
- 30 12. The retrieval unit of Claim 6, wherein said first motor and said second motor are controlled by a computer.

13. The retrieval unit of Claim 11, wherein said first motor, said second motor, and said third motor are controlled by a computer.

14. The retrieval unit of Claim 6, wherein said loader arm is capable of
5 transporting a workpiece from said storage rack to a workstation.

15. The retrieval unit of Claim 14, wherein said workstation is an alignment mechanism.

10 16. An automated microarray printer for performing printing operations on a workpiece, said automated microarray printer having a computer to control the transportation of the workpiece before said printing operations, said microarray printer comprising:

15 a retrieval unit capable of retrieving said workpiece for said printing operations, said retrieval unit having a storage unit and a lifter unit;

said storage unit having a storage frame, a storage rack and a first motor, said storage rack mounted slidably to said storage frame in a first plane, said first motor controlled by said computer and adapted to slide said storage rack in said first plane; and

20 said lifter unit having a loader frame, a loader arm and a second motor, said loader arm mounted slidably to said loader frame in a second plane, said second motor controlled by said computer and adapted to slide said loader arm in the second plane, said loader arm capable of accessing said workpiece from said storage unit, said loader arm having a vacuum chuck to hold said workpiece on said loader arm.

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17. The microarray printer of Claim 16, wherein said workpiece is a microscope slide.

18. The microarray printer of Claim 16, wherein said storage rack has a plurality
30 of slots adapted to receive a plurality of workpiece containers, each workpiece container capable of retaining a plurality of workpieces.

19. The microarray printer of Claim 18, wherein each of said plurality of slots has a sensor to determine whether one of said plurality of workpiece containers is contained within said slot.
- 5 20. The microarray printer of Claim 16, wherein said loader arm has a third motor controlled by said computer and adapted to slide said vacuum chuck in a third plane.
21. The retrieval unit of Claim 16, wherein said loader arm is capable of transporting a workpiece from said storage rack to a workstation.
- 10 22. The retrieval unit of Claim 21, wherein said workstation is an alignment mechanism.
23. A method within a microarray printer machine for retrieving a workpiece in a storage rack and transporting said workpiece to a workstation, said microarray printer machine having a loader arm with a vacuum chuck, said method comprising:
- 15 determining the location of the workpiece in said storage rack;
moving said loader arm in close proximity to said workpiece in said storage rack;
20 extending said vacuum chuck under said workpiece;
activating said vacuum chuck to hold said workpiece on said loader arm; and
moving said loader arm and workpiece to said workstation.
24. The method of Claim 23, wherein said workpiece is a microscope slide.
- 25 25. The method of Claim 23, wherein said step of determining the location of the workpiece in said storage rack includes receiving a set of coordinates for the workpiece from a computer.
- 30 26. The method of Claim 23, wherein said step of moving said loader arm in close proximity to said workpiece includes activating at least one motor that slides said loader arm in at least one plane.

27. The method of Claim 23, wherein said step of moving said loader arm in close proximity to said workpiece includes activating at least one motor that slides said storage rack in at least one plane.
- 5 28. The method of Claim 23, wherein said step of extending said vacuum chuck under said workpiece includes activating at least one motor that slides said vacuum chuck in at least one plane.
29. The method of Claim 23, wherein said step of activating said vacuum chuck
10 includes opening a valve to expose said vacuum chuck to a vacuum source.
30. The method of Claim 23, wherein said step of moving said loader arm and workpiece to said workstation includes activating at least one motor that slides said loader arm in at least one plane.
- 15 31. The method of Claim 23, wherein said workstation is an alignment mechanism for aligning the workpiece.
32. A method within a microarray printer for retrieving a workpiece in a storage
20 rack and transporting said workpiece to a workstation, said microarray printer having a first motor to slide said storage rack in a first plane, said microarray printer having a second motor to slide a loader arm in a second plane, said loader arm having a vacuum chuck, said method comprising:
- 25 determining the location of the workpiece in said storage rack;
 moving said loader arm in close proximity to said workpiece in said storage rack by activating said first motor and said second motor;
 extending said vacuum chuck toward said workpiece;
 activating said vacuum chuck to hold said workpiece on said loader arm; and
 moving said loader arm and workpiece to said workstation by activating said
30 first motor.
33. The method of Claim 32, wherein said workpiece is a microscope slide.

34. The method of Claim 32, wherein said step of determining the location of the workpiece in said storage rack includes receiving a set of coordinates for the workpiece from a computer.
- 5 35. The method of Claim 32, wherein said step of extending said vacuum chuck under said workpiece includes activating at least one motor that slides said vacuum chuck in at least one plane.
36. The method of Claim 32, wherein said step of activating said vacuum chuck
10 includes opening a valve to expose said vacuum chuck to a vacuum source.
37. The method of Claim 32, wherein said workstation is an alignment mechanism for aligning the workpiece.
- 15 38. A retrieval unit for a microarray processing device to transport a workpiece before or after processing operations by said microarray processing device, said retrieval unit comprising:
- a storage unit having a storage frame, a storage rack and a first means for translating said storage rack in a first plane, said storage rack adapted to store said
20 workpiece, said storage rack mounted slidably to said storage frame in said first plane; and
- a lifter unit having a loader frame, a loader arm and a second means for translating said loader arm in a second plane, said loader arm mounted slidably to said loader frame in the second plane, said loader arm capable of accessing said workpiece
25 from said storage rack, said loader arm having a vacuum chuck for retaining said workpiece on said loader arm.
39. The retrieval unit of Claim 38, wherein said microarray processing device is a microarray printer device.
- 30 40. The retrieval unit of Claim 38, wherein said workpiece is a microscope slide.

41. The retrieval unit of Claim 38, wherein said storage rack has a plurality of slots adapted to receive a plurality of workpiece containers, each workpiece container capable of retaining a plurality of workpieces.

5 42. The retrieval unit of Claim 41, wherein each of said plurality of slots has a sensor to determine whether one of said plurality of workpiece containers is contained within said slot.

43. The retrieval unit of Claim 38, wherein said loader arm has a third means for
10 translating said vacuum chuck in a third plane.

44. The retrieval unit of Claim 38, wherein said loader arm is capable of transporting a workpiece from said storage rack to a workstation.

15 45. The retrieval unit of Claim 44, wherein said workstation is an alignment mechanism.